

Societies and Academies.

LONDON.

Optical Society, May 14.—F. W. Preston: (1) The fundamental law of annealing. The fundamental law of annealing, that the rate of decrease of stress varies as the square of the stress present, is deduced from first principles by means of dimensional analysis, assuming that the rate of decrease of stress depends, (1) only on the stress present and the viscosity; (2) on the stress present, the viscosity, and the rigidity of the material. The law suggested as an empirical relation by Adams and Williamson is true dimensionally.—(2) The dimensional accuracy of Mr. Hampton's paper on "The Annealing of Glass." No corrections are made in Mr. Hampton's results, which are based on sound reasoning. The practical conclusions of Mr. Hampton's paper are justified in every way.—T. Smith: Note on the cosine law. Objections raised to the statement that rays selected by a cosine relation determine caustic surfaces in the object and image spaces, and to some points in the proof of the cosine law, are considered, and the adoption of the original enunciation of the theorem justified as opposed to the modified form suggested by Hertzberger and approved by Boegehold. A direct derivation of the analytical form of the law of refraction from the cosine law is given.

Royal Statistical Society, May 19.—Sir Napier Shaw: Week or month as an intermediate time-unit for statistics. In agriculture the week is generally recognised, but the month often exerts a certain dominance; in finance the year is the chief unit and next to that the week; for meteorology the calendar month is dominant and the week is only used at present for special purposes such as correlation with agriculture or hygiene; for railway statistics the calendar month and year again are dominant; for social statistics (Poor Law, etc.), the week is the favourite unit; for trade and shipping the month is used exclusively, whereas the week and corresponding quarters are the bases of vital statistics in the majority of countries; Brazil, Bulgaria, Hungary and Italy, however, use the month for that purpose. Starting from the conclusions: (1) that the original purpose of the month to keep in touch with the phases of the moon has not been successful, (2) that the division of the year into twelve unequal parts is not a fundamental principle of statistical science, (3) that a period shorter than a month is necessary for various reasons of correlation, and (4) that there is no possibility of using monthly data in connexion with weekly data or vice versa; a suggestion is put forward for placing statistical data upon a basis of weeks or groups of weeks with an adjustment to the calendar year. The grouping of the fifty-two weeks of the year into thirteen groups of four weeks each, or four groups of thirteen weeks each, is left open. For general climatic purposes a quarterly arrangement with judicious selection of the quarters might be sufficient.

Geological Society, May 20.—H. Dewey: Palæolithic implements of Chellean type found in the gravel of Hyde Park, London. The implements were collected from gravel thrown out of a deep trench of length 44 feet, breadth 14 feet, depth 40 feet. The London clay has been exposed at the northern end of the excavation, but falls suddenly at the southern end to an unknown depth. The gravel therefore covers a step-like fracture, which curves round from west and east to north-east. The stones are principally Chalk-flints. The implements

were all from a depth of 26 feet. They include one hand-axe of Chellean type; the topmost portion of a second hand-axe; two choppers worked along the edges so as to provide a comfortable hold; two long flakes or flake-scrapers; a broad flake or grattoir; and some pieces showing a certain amount of human workmanship.—J. W. Tutcher and A. E. Trueman: The Liassic rocks of the Radstock District (Somerset). These rocks are unusually interesting, because in some divisions they are very thin; the total thickness of Lias does not exceed 200 feet, and is often much less. The succession of rocks has been worked out. An unusual number of ammonite faunas are richly represented, often in remanié deposits. Deposition of White Lias occurred during a time of fairly uniform subsidence, and was followed by folding along east-and-west axes, and denudations of the anticlinal areas. Deposition was renewed and followed by uplift in the south and denudation of much of the clay there. Then came deposition of the Obtusum nodule-bed and of the Raricostatum clay, and afterwards renewed uplift in the south and denudation. Further deposition included the Armatum bed in the south only, a remanié bed; the Jamesoni limestone, fairly uniformly; and the Striatum and Capricornum clays.

EDINBURGH.

Royal Society, May 25.—John Thomson: Parasitism of *Cuscuta reflexa* (Roxb.). The hyphæ or modified root-hairs are differentiated into strands of tracheids when they meet the xylem vessels of the host. Those which enter the host phloem are not modified; moreover, the shaft of the haustorium contains no sieve-tubes. The irritation set up by the entry of the haustorium stimulates all the living cells in the neighbourhood of the haustorium to active cell-division. In woody host stems the general result is to increase the radius of the stem of the host on the side invaded by the parasite. Connexion with the host xylem is maintained by the differentiation into tracheids of young parenchyma cells at the tip of the haustorium. Experiments in growing the parasite on peeled stems demonstrate that the plant can live on the materials derived from its host's wood, even when its chlorophyll is prevented from functioning by enclosure in a light-tight box. The haustoria formed in such circumstances are perfectly normal except that their size is less. These facts suggest that a plant's xylem is capable of transporting plastic materials as well as water with mineral salts in solution.—C. W. Wardlaw: Size in relation to internal morphology: No. 2, The vascular system of Selaginella. The xylem is in the form of a thin ribbon, an arrangement which makes for a large surface of interchange with living tissue. With increase in size the xylem band widens out. Where the vascular system is of large size, the broad stelar ribbon must be broken up in order to be adequately disposed in the stem. Such species are polystelic, with three to five stelar ribbons, and measurements show that a constant ratio exists between the width of the median stele and the diameter of the stem. The polystelic species have been regarded as derivative and specialised types. From the foregoing argument, however, it follows that polystely is not necessarily a derivative condition in the phyletic sense, but is a modification in form consequent on increase in size. Hence the isolated position of those species which show polystely in Baker's systematic arrangement need not be held as destructive of the validity of that classification.—S. Williams: Some points in the anatomy of *Dicksonia*. *D. antarctica* and *squarrosa*

possess dictyosteles not far removed from solenostely. In both the stele appears in transverse section as a curiously corrugated cylinder due to the oblique passage of the leaf traces through the cortex. Inwardly projecting flanges are present in both species at the margins of the leaf gaps. From a study of the anatomy of the above large stems and of a number of other examples, it is concluded that increase in size of the stele in the vast majority of ferns has been accompanied by (a) adaptations to increase the surface of interchange between the stele and the surrounding tissues, and (b) modifications of the xylem mass to ensure constant contact between the tracheids and living parenchymatous elements.—A. E. Trueman and Miss Daisy Williams: Studies in ammonites of the family Echioceratidæ. The paper deals with those ammonites from the Lower Lias which were formerly referred to *Echioceras varicosatum*. In creating several genera and in describing the species, considerable attention has been paid to the evidence obtained from the study of the ammonite sutures and from the shell development. Discussing relationships and descent, it is shown that the development of an ammonite shell frequently tends to follow the most direct line from the embryo to the adult form, and that this ideal ontogeny may be achieved by the skipping of ancestral stages which do not fall on the direct line or which do not fit the embryo for its particular environment.

PARIS.

Academy of Sciences, June 8.—L. Lecornu: The phenomenon of refraction. A discussion of the condition which must be fulfilled by a force acting on a material point so that its velocity on change of medium may vary as predicted by the wave theory. Jules Andrade: Concerning a theorem of metrology: elastic clocks and spiral balances.—Tzitzéica: Certain skew curves.—M. Soubbotine: The law of errors of observation.—Lawrence M. Graves: Taylor's theorem in general analysis.—D. Pompeiu: The monogeneity of functions of one complex variable.—P. Nogués: The invention of the kinematograph. During the period from 1882 to 1890, Marey realised the fundamental arrangement which constitutes what is now called the kinematograph.—L. Ollat: The resonance of coupled circuits.—J. Cayrel: Detection with galena. With a single isolated sensitive crystal, only the (111) faces have given rise to normal intense detection. The (100) faces, on the contrary, show a very feeble detection, nearly always inverted and often unstable. With insensitive crystals the (111) and (100) faces behave similarly: both show inversion.—E. Bodin: The peculiarities presented by radiation cells of great electrical resistance.—G. Ribaud: High frequency induction electric furnaces for the production of very high temperatures. A description of the construction of an induction furnace open at two ends and permitting the attainment of a temperature of 2500° C.—G. Reboul: A new mode of production of slow cathode rays.—La Rosa: The velocity of light and its dependence on the movement of the source of light. Reply to a communication by M. Salet.—Léon and Eugène Bloch: The spark spectra of chlorine. An extension of the method of analysis of spark spectra given by the authors in an earlier communication and its application to the analysis of the spark spectra of chlorine.—Pierre Auger and Francis Perrin: Theoretical considerations on the directions of emission of the photo-electrons.—Pierre Brun: The miscibility of mixtures of water, ethyl alcohol, and isobutyl alcohol. The results of the experiments are given in the form of graphs.—

Georges Denigès: A new method of diagnosis and of immediate determination of cobalt by spectroscopy and chromoscopy. The blue colour given by cobalt compounds with hydrochloric acid has a specific absorption spectrum: the reaction detects 0.02 milligram per cubic centimetre of solution. The method is of service in the detection and estimation of traces of cobalt in commercial nickel and its salts.—Maurice Nicloux: The determination of carbon monoxide by the blood method and some remarks on the absorption of this gas by hæmoglobin in the absence of oxygen. Details of the technique of the method, which is shown to be capable of detecting carbon monoxide in the proportion of 3 parts per million.—M. Bourguet: The hydrogenation of the triple link. The formation of *cis*-ethylenic compounds. Using colloidal palladium as the catalytic agent, the reduction with hydrogen at the ordinary temperature of various acetylene derivatives has always given the *cis*-ethylene compound. This is in accord with the geometrical representation ordinarily adopted for the double and triple linkages in acetylene and ethylene derivatives.—Max and Michel Polonovski: The aminoxides of the alkaloids of the tropane group.—R. Locquin and R. Heilmann: New trinitrogen bases: the ureas of the pyrazolines.—E. E. Blaise and Mlle M. Montagne: The acyclic δ -diketones. Transformation into pyridine derivatives. The action of hydroxylamine upon the δ -diketones constitutes a general method for the preparation of pyridine bases.—R. Bourret: The geology of the region of Pak Lay (Middle Laos).—L. Duparc: Some curious lode-bearing rocks in the neighbourhood of Mestigmer (Morocco).—E. Vander Linden: A case of striking by lightning.—Marcel Mirande: The phytosterol of the scales of bulbs in the species of the genus *Lilium*.—C. Charaux and P. Delauney: The presence of loriglossine in *Listera ovata* and *Epipactis palustris* and on some new reactions of this glucoside.—R. de Litardière: The phenomenon of cytotoxicity in the microsporocytes of *Podophyllum peltatum*.—Ladislav Smolik: The exchange of the aluminium ion of soils of different types against the potassium ion of a neutral salt.—Antonin Nemeč: The hydrogen-ion concentration in the tissue of seeds. The experiments recorded show that the hydrogen ion concentration in the seed tissues indicates, at least approximately, the value for the reaction of the medium favourable to the development of the plants arising from the seeds.—Auguste Lumière and Rémi Courjon: The influence of the time of coagulation of the blood on the toxicity of sera.—L. M. Betances: The genesis of the blood platelets.—H. Chatellier and H. P. Chatellier: The embryological evolution of the endolymphatic outlet in man.—E. Aubel and J. Salabartan: The significance of the decomposition products formed by the coli bacillus at the expense of glucose.—P. Lasareff: The statistical theory of the adaptation of the eye in the course of peripheral vision.—Ch. Porcher: The action of carbonic acid on the calcium caseinates. Introduction to the study of colloidal calcium carbonate.—P. Cappe de Baillon: The general characters of double monsters in phasmids.—J. Beauverie: Does the bacterial symplasm exist? The case of *Azobacter*. After an extended period of cultivation of *Azobacter chroococcum*, it has not been found possible to prove the existence of a regenerative symplasm which was not the result of a degenerescence, of a contamination, or of an erroneous interpretation. The author regards the formation of a bacterial symplasm as unproven.—Charles Kayser and Mlle Eliane Le Breton: The regulating mechanism of purin metabolism: diabetes.—Paillot: The cytological

alterations in the course of the evolution of the disease of the nucleus of the larvæ of *Pieris Brassicæ*.

CAPE TOWN.

Royal Society of South Africa, April 15.—H. Spencer Jones: Notes on solar parallax. A good determination of this constant is important for establishing a base-line on which our knowledge of the dimensions of the visible universe is founded. The methods of its determination may be divided into three classes: (1) The observation of the apparent displacements of a planet like Mars or Eros against one or more stars viewed from two points differently situated in relation to the centre of the earth; (2) determinations of the orbital velocity of the earth compared with the velocity of light; (3) observations of occultations of stars by the moon, from which the perturbing influence of the sun on the moon's orbit can be ascertained. The best determinations of the solar parallax from these three independent methods lead to almost identical results, namely, $8''.805$ with a probable error $+0''.002$.—Louis P. Bosman: Some observations on aconitine: Aconitine ($C_{34}H_{47}NO_{11}$) on oxidation yields oxonitine $C_{24}H_{31}NO_9$. It is known to contain three (CH_3O) groups, one (CH_3CO) group, one (C_6H_5CO) group, and one $N \cdot CH_3$ group. There seems to be an inner anhydride of a dicarboxylic acid.

WASHINGTON, D.C.

National Academy of Sciences (Proc. Vol. II, No. 4, April).—T. Y. Thomas: On the projective and equi-projective geometries of paths.—O. Veblen and J. M. Thomas: Projective normal co-ordinates for the geometry of paths. They are independent of the components of affine connexion appearing in the differential equations of the paths. Equations of paths through the origin are linear.—J. M. Thomas: Note on the projective geometry of paths. Projective tensors other than the Weyl curvature tensor can be derived.—W. Hovgaard: Determination of the stresses in a beam by means of the principle of least work. No *a priori* assumptions are made as in Saint-Venant's method.—M. T. Bogert and C. N. Andersen: Researches on selenium organic compounds. V. A simple method for the synthesis of 2-substituted benzoselenazoles.—Alice H. Armstrong, W. Duane, and R. J. Havighurst: The reflection of X-rays by alkali halide crystals. Using a potassium iodide crystal and reflecting X-rays from the 100 planes gave a double image and a series of fine lines, due apparently to minute crystals with their axes parallel to that of the main crystal. This habit of crystal growth is suggested as the cause of the abnormal reflections obtained with the alkali halides.—I. I. Rabinov: Note on the diffraction of X-rays by a wedge-shaped slit. A fringe was obtained using the K_α line of molybdenum. Calculated width of slit, $0.0013-0.0018$ mm.—D. L. Webster and P. A. Ross: The Compton effect with hard X-rays.—E. O. Salant: The heat capacity of solid aliphatic crystals. Many assumptions are made, but equations are derived from which results fairly in accord with experiment can be computed.—G. P. Baxter and H. W. Starkweather: The density and atomic weight of helium. Three 1-litre globes were used, as in the determination of the density of oxygen (NATURE, March 28, p. 483). Average density of helium, 0.17845 . Using the density found above for oxygen, namely, 1.42901 , and assuming that helium obeys Boyle's Law for the range 0-1 atmosphere, the atomic weight of helium, for various values of $(PV)_0/(PV)_1$ of oxygen, varies from 3.9995 to 4.0000.

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Diary of Societies.

TUESDAY, JULY 14.

SOCIETY OF CHEMICAL INDUSTRY (Annual Meeting) (at Leeds), at 11 A.M.—Presentation of the society's medal to W. F. Reid.—Presidential Address: Dyestuffs.—In evening.—Prince G. Conti: How the Tuscany Boric Acid is made (Lecture).
CONVENTION OF ENGLISH-SPEAKING OPHTHALMOLOGICAL SOCIETIES (at University College) (also on July 15, 16, 17).

WEDNESDAY, JULY 15.

SOCIETY OF CHEMICAL INDUSTRY (Annual Meeting) (at Leeds), at 9.30 A.M.—Symposium on Coking Practice; Chairman, Prof. J. W. Cobb.—Dr. R. Lessing: The Influence of Ash Constituents on the Coking Process.—R. A. Mott and R. Wigginton: The Heating of Coke Ovens.—C. P. Finn: The Disposal of Coke Oven Gas for Public Supply.—W. H. Hoffert: A Comparison of Different Solid Adsorbents proposed for Benzole Recovery.
INTERNATIONAL CONFERENCE OF WOMEN IN SCIENCE, INDUSTRY, AND COMMERCE (at British Empire Exhibition, Wembley), at 11 A.M.—Opening of the Conference by the President, H. R. H. the Duchess of York.—Speakers: Viscountess Rhonda: Commerce.—Miss Ellen Wilkinson: Industrial Organisation.—Prof. Winifred Cullis: Science.
EUGENICS EDUCATION SOCIETY (at Royal Society), at 8.30.—Dr. J. A. Mjoen: The Analysis of the Component Faculties of Musical Ability and their Inheritance (Lecture).

THURSDAY, JULY 16.

SOCIETY OF CHEMICAL INDUSTRY (Annual Meeting) (at Leeds), at 9.30 A.M.—Symposium on Smokeless Fuel.—Dr. C. H. Lander and Dr. Margaret Fishenden: Smokeless Fuel—the Present Position and Future Possibilities.—E. C. Evans: Solid Smokeless Fuels: their Production, Properties, and Use.—F. S. Sinnatt and J. G. King: A Study of the Tars and Oils obtained from Coal.
INTERNATIONAL CONFERENCE OF WOMEN IN SCIENCE, INDUSTRY, AND COMMERCE (at British Empire Exhibition, Wembley), at 10.30 A.M.—Engineering, Chemistry, and Research:—Miss H. M. Davis: Electricity applied to Mining.—Miss Isabel H. Hadfield: Some Chemical Problems in the Cotton Industry.—Miss Ethel Bailey: Automotive Research.—At 2.30.—Industrial Welfare and Factory Inspection.—Miss Constance Smith: The Woman Factory Inspector in Industrial History.—Miss C. U. Kerr: The Effect of Welfare Work on Health and Efficiency.—Miss E. E. Wilson: The Possibilities of Advancement for Women in Industry.

FRIDAY, JULY 17.

INSTITUTION OF CHEMICAL ENGINEERS (Annual Meeting) (in Philosophical Hall, Leeds), at 9 A.M.—At 9.30 A.M. (Joint Meeting with the American Institute of Chemical Engineers)—Presidential Addresses by the President of the American Institute, Dr. C. L. Reese, and the President of the British Institution, Sir Arthur Duckham.—At 10.30 A.M.—Symposium on Industrial Water Supply and Stream Pollution.—F. P. Veitch and L. C. Benedict: Wool Scouring Waste Liquors, Composition and Disposal.—Dr. T. L. Bailey: Effluents from Ammonia Plants and their Disposal.—R. D. Littlefield: Distillery Waste Liquids and their Purification.—E. B. Besselièvre: Statutory Regulation of Stream Pollution and the Common Law.—Dr. E. B. Higging and J. P. O'Callaghan: The Preparation and Comparative Performance of Base-Exchange Materials in Water Softening.—Dr. T. P. Hilditch: Recent Experience of Doucill in Water Softening.—H. C. Parker: Electrolytic Conductivity and Hydrogen Ion Control.—S. L. Tyler: The Absorption of Hydrochloric Acid and Some Data regarding the Tyler-Vitreosil System.—W. L. Stevenson: The State versus Industry, or The State with Industry.—J. W. Sale: Pioneer Studies by the Bureau of Chemistry on Pollution of Shellfish Areas.
INTERNATIONAL CONFERENCE OF WOMEN IN SCIENCE, INDUSTRY, AND COMMERCE (at British Empire Exhibition, Wembley), at 10.30 A.M.—Commerce and Salesmanship:—Miss G. Burlton: Salesmanship.—Miss L. F. Nettlefold: The Place of the Wholesaler in the Scheme of Distribution.—At 2.30.—Electricity—Domestic Science:—Miss M. Partridge: Producing and Distributing Electricity.—Miss T. J. Dillon: At Home with Electricity.

SATURDAY, JULY 18.

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS (at Town Hall, Folkestone), at 11 A.M.—A. E. Nichols: Municipal Works at Folkestone.—E. C. Fawcett: Folkestone's New Sea Outfall Works.

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